APPENDIX I

GLOSSARY

ABERRATION–A defect in the formation of an optical image; for example, astigmatism, chromatic aberration, curvature of field, and so forth.

ABSOLUTE TEMPERATURE–The temperature measured from absolute zero. Expressed as degrees Kelvin (°K) in the Centigrade system where absolute zero is –273°C or in degrees Rankine in the Fahrenheit system where absolute zero is –459°F on the scale.

ACCELERATOR–Chemical constituent of photo–graphic developers that activates the developing agent and swells the gelatin to hasten penetration of the solution. See SODIUM HYDROXIDE, SODIUM CARBONATE, SODIUM META–BORATE, and SODIUM BORATE.

ACHROMATIC COLORS–Colors perceived as having no hue (white, black, gray, and silver).

ACHROMATISM–The absence of chromatic aberration.

ACID, ACETIC–A colorless liquid of pungent odor used in stop baths and in fixing baths. In concentrated form it attacks the skin and produces painful blisters. A concentrated solution of 99% solidifies at 62°F and forms a mass resembling ice (Glacial Acetic–Acid).

ACID, BORIC (BORACIC ACID) H_3BO_3– Colorless, odorless, transparent crystals, or a white amorphous powder. Slightly soluble in water and more soluble in glycerine and alcohol. Used in toning and fixing baths.

ACID, SULFURIC, H_2SO_4– syrupy, odorless liquid, colorless or slightly yellow. Used for preparing a tray–cleaning solution and in fixing and reducing solutions.

ACTION–Movement within a scene being photo–graphed. Also, the picture portion of a motion picture as differentiated from the sound track portion.

ACUTANCE–An objective measure of the ability of a photographic material to show a sharp line of demarcation between contiguous areas receiving low and high exposures. It correlates well with subjective judgments of picture sharpness. It is the mean of the square of the density gradients times the density scale over a boundary.

ADDITIVE PROCESS–Any color process in which a reproduction is formed by a combination of images each of which supplies color in proportion to the color observed in the original scene. In a typical, three–color additive process, the colors of the images are blue, green, and red. See SUB–TRACTIVE PROCESS.

AGC–Automatic gain control. Regulates the volume of the audio or video light levels automatically within a camcorder.

AGITATION–The act of moving a photographic film, plate, or paper in a processing bath or moving the bath relative to the photographic material during processing.

AIR BELLS–(1) Air bells are bubbles of air that prevent contact between a processing bath and localized areas on the surface of a photographic material. (ASA) (2) Undeveloped spots on negatives or prints caused by air bubbles, preventing access of developer.

ALKALI–A water soluble compound capable of uniting with and neutralizing acids. The alkalies commonly used for photographic processing baths are sodium hydroxide, potassium hydroxide, sodium carbonate (monohydrate and anhydrous), potassium carbonate, sodium tetraborate, sodium metaborate, and ammonium hydroxide.

AMBIENT SOUND–Background sound or wild sound. Sound that surrounds the scene or location, received by the microphone and recorded onto magnetic tape.

AMMONIUM THIOSULFATE, $(NH_4)_2S_2O_3$–A white salt freely soluble in water. Used in the preparation of rapid–fixing solutions.

ANALOG–An analog signal that fluctuates exactly like the original stimulus (for example, sweep second–hand clock, phonograph player).

ANGLE OF ACCEPTANCE–The angle that objects must align within to affect the reading of a photoelectric exposure meter.

ANGLE OF FIELD–A property of a lens. The angle subtended by the lines that pass through the center of the lens and locate the diameter of the maximum image area within the specified definition of the lens. Also called angular fields.

ANHYDROUS–Dry, containing no water of crystallization.

ANTICURL BACKING–A transparent, gelatin coating sometimes applied to the opposite side of a photographic film from the emulsion to prevent curling by balancing the forces that tend to curl the film, as it is wet and dried during processing.

ANTIHALATION COATING–A light–absorbing coating applied to the back side of the support of a film or plate, or between the emulsion and the support, to suppress halation (also called antihalation backing). *See* HALATION.

ANTISLUDGE AGENT–A chemical compound added to photographic processing solutions to prevent the formation of sludge. Sodium metaphosphate and boric acid are commonly used for this purpose.

APERTURE–In an optical system, an opening through which light can pass.

APERTURE, CURTAIN–The slit in a focal–plane shutter that permits light to reach the film. The slit size may be either fixed or variable.

ARTIFICIAL LIGHT–Illumination provided by incandescent, fluorescent, or flame sources.

ASPECT RATIO–The ratio of the height to the width of the film or television frame; that is, three units high to four units wide (3:4).

ASTIGMATISM–A lens aberration that causes an off–axis point to be imaged as a pair of lines at right angles to each other and in different focal planes. A lens having astigmatism is unable to image horizontal and vertical lines in the same plane with equal sharpness.

ATMOSPHERIC PERSPECTIVE–Applied to the effect of distance created by atmospheric haze in a photograph. It lightens the tones as the distance increases.

AUDIO TRACK–The area of the videotape that is used for recording audio information.

AUTO IRIS–An automatic control of the lens diaphragm.

AUTOFOCUS–A feature of certain cameras or enlargers by which the image is kept in focus automatically regardless of the degree of reduction or magnification.

AVOIRDUPOIS–The system of weights commonly used in the United States and the British Empire in which the primary unit is the pound (7,000 grains); usually expressed in pounds, ounces, and binary fractions thereof.

BACK LIGHT–Illumination from behind the subject in a direction substantially parallel to a vertical plane through the optical axis of the camera.

BACKGROUND–(1) That part of the landscape which is more distant than the principal object from the camera. (2) A screen, drape, or projected scene used in a photography studio behind the subject.

BACKING PAPER (ROLL FILM)–The protective strip of paper to which the film is attached. Backing paper is usually black on one side and colored on the opposite side. Numerals are usually printed on the colored side in a position where they can be viewed through the camera window. Also called duplex paper. (ASA)

BARN DOOR–Folding wings used in front of studio spotlights to aid in directing the light and to shade portions of the subject from direct illumination.

BASE DENSITY–The density of a film base. No plastic is 100% transparent, so all films have some base density.

BATH–Any chemical solution used in processing photographic materials.

BEAM SPLITTER–An optical system so arranged as to reflect or transmit two or more portions of a light beam along different optical paths.

BELLOWS–The extensible lightproof device that joins the lens board to the film support section of a camera

BLEACH, PHOTOGRAPHIC–(1) To remove an image from a photographic film. Especially to do this by converting a metallic silver image to a halide or other salt that can be removed from the film with hypo. When bleaching is not carried to completion, it is called reducing. (2) Any chemical reagent that can be used for bleaching. (3) Any chemical solution used for bleaching.

BORAX–Sodium tetraborate, $Na_2B_4O_710H_2O$; a mild alkali used as an accelerator in photographic developers, particularly for fine–grain effects.

BRIGHTNESS RANGE–Variation of light intensities from maximum to minimum. Generally refers to a subject to be photographed. For example, a particular subject may have a range of one to four-that is, four times the amount of light is reflected from the brightest highlight as from the least bright portion of the subject.

BULB EXPOSURE–An exposure in which the shutter remains open as long as the shutter release mechanism is depressed.

BURNING IN–In photographic printing, a technique by which selected areas of the image are given extra exposure, and the rest of the image is protected against added exposure.

CABLE RELEASE–A device consisting of a stiff wire encased in an outer flexible covering designed to trip a camera shutter without touching the camera itself. One end is threaded to fit the shutter, and the other has a thumb–operated plunger.

CAMCORDER–A portable video camera with videotape recorder (VTR) and a microphone attached to form a signal unit.

CAMEL-HAIR BRUSH–Term used to define any brush with superfine, soft bristles used for dusting lenses and front surface mirrors.

CAMERA–A lighttight chamber, usually fitted with a lens, through which the image of an object is recorded on a light-sensitive material.

CAMERA, IDENTIFICATION –A type of still-picture camera used primarily for the making of identification photographs.

CAMERA, REFLEX–A camera containing a reflecting mirror within the box, so the image may be focused on a ground glass on top of the camera. A single-lens reflex camera has a device to swing the mirror out of the way during the exposure. A twin-lens reflex camera uses two lenses: one for the viewing image and one for the actual picture-making.

CAMERA, VIEW–A tripod-mounted camera that has incorporated into its construction a long bellows, a rising and falling front, horizontal and vertical swing, lateral shift of front and back, and either a reversible or a rotating back The view cameras versatility is valuable for the correction of distortions in architectural, close-up, and illustration photography.

CAPSTAN–An electrically driven roller that rotates and transports the videotape past the recorder heads at a precise and fixed speed.

CASSETTE–A light-trapped metal or plastic container for a length of roll film to enable it to be loaded into a camera in full light.

CCD–Charged-coupled device, also called a chip. A small, solid-state (silicon resin) imaging device used in a video camera instead of camera pickup tubes. Inside the chip, image-sensing elements translate the optical image into a video signal. Chip cameras are insensitive to burn in.

CELL, PHOTOELECTRIC–A device by which light is transformed into electrical energy. Used as the sensitive element in exposure meters and optical sound reproducers and projectors.

CENTIGRADE –A thermometer scale having 100 divisions between the freezing and boiling points of water in universal use for scientific purposes. Also called Celsius after its inventor. Centigrade temperatures may be converted to Fahrenheit temperatures with the following formula:

$$F=9/5C+32$$

when F = Fahrenheit temperature and C = Centigrade temperature. (PIA)

CENTIMETER–A unit of length in the metric system which is 0.01 of a meter. According to American standards, 1 inch is equivalent to 2.54 centimeters (cm). (PIA)

CHARACTER GENERATOR–An electronic device to create words or graphics that may be electronically inserted or "keyed" over the video picture.

CHARACTERISTIC CURVE–The curve showing the relationship between exposure and resulting density in a developed photographic image. It is usually plotted as the density against the log exposure in candle-meter-seconds. Called also the "H. and D. curve" and the "sensitometric curve." The abscissa is sometimes an arbitrary relative exposure.

CHEMICAL FOG –Fog appearing during development of parts of a film not exposed to light. (PIA)

CHROMAKEY–An electronic special effect that combines two video sources into a composite picture, creating the illusion that the two sources are physically together.

CIRCLE OF ILLUMINATION–The total image area of a lens, only part of which is actually used in taking a picture.

CLOSE-UP–A photograph or a motion-picture scene taken at a very close range that shows intimate detail and captures and holds audience interest.

COATING, LENS–A thin, transparent coating applied to the surface of lenses or other optical parts to reduce reflection.

COINCIDENCE–Agreeing as to position. In a coincidence type of range finder, when the two half images of a distant object are in exact juxtaposition, they are said to be "in coincidence."

COLLIMATED–A beam of light is said to be collimated when all of its rays have been made parallel. See SPECULAR.

COLOR BALANCE–The relationship between the three images composing a color negative or positive that provides an accurate (or, more generally, the most pleasing) reproduction of natural colors. (PIA)

COLOR BARS–A color standard used by the television industry for the alignment of cameras and videotape recordings.

COLOR CHART–Target for test photography composed of pigmented areas having colors of high saturation, often accompanied by gray scales, and useful in both color photography and in black-and-white reproduction of colored objects. An assembly of chromatic samples illustrating a scheme of color classification. (PIA)

COLOR COMPENSATING FILTER–A filter used to change the overall color balance of photographic results obtained with color film and to compensate for deficiencies in the quality of the light when printing color films.

COLOR TEMPERATURE–The temperature to which a black body radiator must be raised in order that the light it emits may match a given light source in color; usually expressed in degrees Kelvin (°K).

COLOR TEMPERATURE METER–An instrument for estimating the spectral quality of a light source or the illumination on a scene and expressing the value in terms of color temperature. (PIA)

COLOR TRANSPARENCY–A positive image in natural colors on a transparent support intended for projection or for viewing by transmitted light. (PIA)

COLORBLIND–Applied to photographic layers having only natural silver halide sensitivity to blue, violet, and ultraviolet rays. (PIA)

COMA–An aberration of a lens that causes oblique pencils of light rays from an object point to be imaged as a comet-shaped blur.

COMPONENT–The processing of RGB (red, green, and blue) channels as three separate channels.

COMPOSITE SIGNAL (Y/C)–(Also called NTSC signal.) The video signal in which luminance "Y" (black and white) and chrominance (red, green, and blue) and sync information are encoded into a single signal.

CONJUGATE DISTANCE–The distances of object and image from the lens are called conjugate distances. For every position that an object may occupy with respect to a lens, there is a corresponding position for the image.

CONTACT PRINT–Print produced by exposure in immediate contact with the original or negative. These prints are the same size as the original or negative.

CONTAMINATION–Foreign matter in a processing solution which impairs its operation.

CONTINUOUS TONE–Photographs in which the detail and tone values of the subject are reproduced by an infinite gradation of gray densities between white and black. (PIA)

CONTRAST, LOW–A term expressing a relationship of image tones in which highlights and shadows are represented by very little difference in densities.

CONTRASTY–Photographic term applied to images showing accentuated highlights and shadows. (PIA)

CONTROL TRACK–The area of the videotape used for recording the synchronization information (sync spikes).

COPY–(l) Any document or photograph to be reproduced. (2) The results of such reproduction. (3) (Verb) The act of reproducing a document.

COPYBOARD–The board, frame, or other device for holding copy to be photographed.

CORROSION–The erosion of metals, as by the action of an acid or an alkali; rusting; oxidation. (PIA)

COUPLER–Chemical compound in color developer that can react with the oxidized developing agent in the sensitized material to form a dye color.

CRITICAL FOCUS–That point of focus at which resolution is at its maximum. (NMA)

CROP–To trim or cut off parts of the picture by printing methods to eliminate superfluous portions, and thus improve the composition.

CROP MARKS–Markings placed on original copy, indicating where part of the top, bottom, or sides of the picture are to be omitted.

CURVATURE OF FIELD–An aberration of a lens that causes the image of a plane to be focused into a curved surface instead of into a plane.

CUTAWAYS (MOTION PICTURE)–Shots of related and previously established outside interest used to divert the audience attention in order to cover jumps in action, screen-direction changes, and passage of time.

D-LOG E CURVE–*See* CHARACTERISTIC CURVE.

DARK SLIDE–The opaque slide that covers the film in a film holder, plate holder, film pack, or film magazine.

DARKROOM–A room in which all light of color quality not safe for undeveloped sensitized materials has been excluded. It is used for loading and unloading and the developing of exposed photographic film or paper.

DENSITOMETER–Device to measure the optical density of an image or base by measuring the amount of incident light reflected or transmitted. (NABDC)

DENSITY–The light-absorbing quality of a photographic image is usually expressed as the logarithm of the opacity. Several specific types of density values for a photograph may be expressed; however diffuse transmission density is one of the most important for photographic transparency materials, such as negatives. Diffuse reflection density is generally of interest for photographic prints.

DEPTH–In a nonstereoscopic picture, an illusion of three-dimensional space that is sometimes created by a combination of favorable lighting and coloring of the set and favorable viewing conditions for the reproduction.

DEPTH OF FIELD–The distance between the points nearest and farthest from the camera that are acceptably sharp at a given lens setting.

DEPTH OF FOCUS–The allowable error in lens-to-film distance within which an acceptably sharp image of the subject focused upon will still be obtained.

DEVELOPER (CHEMICAL)–A chemical reagent used to produce a visible image on an exposed photographic layer.

DEVELOPER, COLOR–A photographic developing solution capable of reducing silver halides with the simultaneous production of an insoluble colored oxidation product in the regions where silver is deposited.

DEVELOPING AGENT–Chemicals used in the photographic processing baths to convert the latent image into a visible and photographically useful image.

DIAPHRAGM–A device, such as a perforated plate or an iris, that limits either the aperture of the lens, the field covered by the lens, or both, depending upon its location.

DICHROIC FOG–A deposit of colloidal silver on a photographic film caused by improper processing. This deposit commonly appears red by transmitted light and greenish by reflected light.

DIFFRACTION (OPTICS)–The bending of light waves around the edges of opaque objects.

DIFFUSER–Device for obtaining diffuse direct illumination, such as a wire screen, piece of cloth, or translucent membrane, placed between a light source and the subject illuminated.

DIFFUSION–(l) (Optical) The scattering of light rays so as to cause the light falling on a surface or passing through an aperture to be coming from all directions in contrast to the regular radiation of light from a point source. Diffusion may be introduced by reflection from a matte surface, by transmission through a frosted or opal glass, or by the use of an integrating bar. When diffusion is complete, a sharp image of the light source can no longer be seen, and its place is taken by a uniform, extended source that emits light equally in all directions. (2) (Chemical) The migration of molecules or ions in a solution tending to reduce a difference in concentration between two adjacent regions.

DIGITAL VTR–A videotape recorder that translates and records the analog video signal in digital form.

DIRECT POSITIVE–A positive image obtained directly from another positive image without the use of a negative.

DODGING–A printing technique in which certain areas being exposed are temporarily shielded, thereby producing a different exposure than that used for the rest of the print.

DROPOUT–A loss of part of the video signal that appears as white glitches. Caused by dirty VTR heads or poor quality videotape.

DRY MOUNTING–A method for mounting photographs or artwork on a support by means of a thermosetting laminate that is heated to effect a bond. (PIA)

DRYING MARK–Spots or streaks on negatives and prints differing in density from the surrounding area, produced by uneven drying of the film during processing.

DUB–Duplication of an electronic recording, either tape to tape, record to tape, or vise versa. Dub is always one generation away from the original recording.

EKTACHROME–A trademark of Eastman Kodak Company for a multilayer reversal color film in which couplers are incorporated in the emulsion layers that form dyes in the emulsion during processing.

EKTACOLOR–A trademark of Eastman Kodak Company for a multilayer color negative film in which dye couplers are incorporated in the emulsion layers which upon development produce dye images complimentary to the object colors. Unused couplers remaining in the emulsion after development provide automatic masking for correction.

ELECTROMAGNETIC SPECTRUM–The entire range of wavelengths, extending from the shortest to the longest or conversely, that can be generated physically. This range of electromagnetic wavelengths extends almost from zero to infinity and includes the visible portion of the spectrum known as light.

EMULSION (SILVER HALIDE)–A suspension of light-sensitive silver salt, especially silver chloride or silver bromide, in a colloidal medium, usually gelatin, used for coating photographic film, plates, or papers.

EMULSION SIDE–That side of a (single coated) photographic film on which the emulsion has been coated

EMULSION SPEED–A comparative measure for a given emulsion of exposure to light required to produce a correctly exposed image.

ENLARGEMENT–A print made from a smaller negative through a projection process.

ENLARGER–A photographic projection printer. (PIA)

EXHAUSTION–The state of depletion reached by a processing solution due to age or use that makes it incapable of producing satisfactory results. (PIA)

EXPIRATION DATE–A date placed on sensitized photographic material packaged by the manufacturers to limit the period during which it is warranted to produce normal results.

EXPLODED VIEW–A photograph showing the correct sequence and relationship of the various parts of an assembly. Also called an exploded photograph.

EXPOSURE–(l) The act of exposing a light-sensitive material to a light source. (2) A section of a film for an individual exposure, as a roll containing six exposures. (3) The time during which a sensitive surface is exposed, as an exposure of 2 seconds. (4) The product of light intensity and the time during which it acts on a film, plate, or paper.

EXPOSURE INDEX–An exposure index is the rating of a film for use in connection with exposure tables, exposure computers, and exposure meters.

EXTENSION TUBE–A device used to increase the lens-to-film distance for extreme closeup photography.

FAHRENHEIT–A thermometer scale, on which, under standard atmospheric pressure, the freezing point of water is 32 degrees, and the boiling point of water is 212 degrees; usually indicated as 32°F and 212°F. Fahrenheit temperatures may be converted to Centigrade temperatures with the following formula:

$$C = 5/9 (F - 32)$$

when C = Centigrade temperature and F = Fahrenheit temperature. (PIA)

FAST–Having a high-photographic speed. The term may be applied to a photographic process as a whole, or it may refer to any element in such a

process, such as the optical system, the emulsion, or a developer.

FAST FILM–Photographic material of relatively high sensitivity to light, having a high-exposure index. (PIA)

FIELD–Scanning lines in one half of one video or television frame. There are two fields (one odd, one even) in a frame. One field equals 262.5 scanning lines that create a total of 525 standard television lines or one frame. Also known as the NTSC signal (U.S. T.V. system).

FILM, COLORBLIND–Film which is sensitive only to light of very short wavelengths (ultraviolet, violet, and blue). (NMA)

FILM, PHOTOGRAPHIC, INFRARED–Film coated with an emulsion especially sensitive to infrared light.

FILM, PHOTOGRAPHIC, ORTHOCHROMATIC (ORTHO)–A black-and-white film coated with an emulsion that is sensitive to ultraviolet, violet, blue, and green radiation. Not being sensitive to red, red objects photographed with orthochromatic films are rendered dark on the print.

FILM, PHOTOGRAPHIC, PANCHROMATIC (PAN)–A black-and-white film coated with an emulsion that is sensitive to ultraviolet, violet, blue, green, and red radiation. The special sensitivity of panchromatic films approach that of the human eye.

FILM, PHOTOGRAPHIC, REVERSAL–A film which after exposure is processed to produce a positive image instead of the customary negative image. Reversal films may be black and white or color.

FILTER–Photographic. A layer of glass, gelatin, or other material used to modify the transmitted light selectively.

FILTER, NEUTRAL DENSITY–One not selective for a certain portion of the spectrum but absorbing all colors equally, thus reducing the intensity of light without changing its chromaticity.

FILTER FACTOR–The number of times exposure must be increased to compensate for light absorbed by a filter.

FIXED FOCUS–The term applied to optical instruments and photographic equipment that are not provided with a means for focusing.

FIXER–A solution used to remove undeveloped silver halides from photosensitized emulsions. The fixer usually contains sodium or ammonium thiosulfate, a hardening agent, and an acid or acid salt.

FIXING AGENT–A photographic chemical that dissolves the silver halides not used for producing an image to preserve the photograph from further photographic effect upon subsequent exposure to light. Common fixing agents are sodium thiosulfate and ammonium thiosulfate.

FLARE–A defect of optical systems in which scattered light resulting from reflections at optical surfaces, the walls of the camera, or imperfections in the optical parts, reaches the image plane and produces an overall fog or flare spot that damages the photographic quality of the resulting record.

FLASH, ELECTRONIC–A high-voltage light source for photographic illumination, producing a momentary flash of light of high intensity in an atmosphere of gas enclosed in a tube that can be used repeatedly. (PIA)

FLAT–An image is said to be "flat" if its contrast is too low. Flatness is a defect that does not necessarily affect the entire density scale of a reproduction to the same degree. Thus a picture may be "flat" in the highlight areas or "flat" in the shadow regions, or both.

FLOATING LID–A lid designed to float on the top of a photographic processing solution to reduce aerial oxidation.

FLOODLIGHT–A photographic light used to produce even lighting on large subjects. A floodlight spreads light evenly over a wide angle, as distinguished from a spotlight that concentrates light in a beam.

FLUID OUNCE–A unit of capacity in the Liquid Measure System equal to 1.8 cubic inches; it is equal to 29.57 milliliters.

FOCAL PLANE–The surface (plane) on which an axial image transmitted by a lens is brought to sharpest focus; the surface occupied by the light-sensitive film or plate in the camera.

FOCAL POINT–The point at which converging rays of light from a lens meet.

FOCUS–(l) The point at which rays of light passing through different parts of a lens converge to form a sharp image of the original. (2) (Verb) To adjust the position of either the lens or focusing screen in a

camera or projector to secure the sharpest possible image of the object.

FOG–Nonimage photographic density. The defect is due either to the action of a stray light, to improperly compounded processing solutions, or to wrongly stored or outdated photographic materials.

FOREGROUND (PHOTOGRAPHY)–That part of the landscape imaged in a horizontal or oblique photograph that is closer than the principal object to the camera. (ASP)

FRAME–(l) Any single exposure contained within a continuous sequence of photographs. (2) The smallest unit in television or film-a single picture. A complete scanning cycle of the two fields every l/30 second. A frame equal to 525 scanning lines.

FREEZE FRAME–Arrested motion that is perceived as a still shot.

FULL APERTURE–The maximum opening of a lens diaphragm. (PIA)

FULL STOP–The standard series of diaphragm markings, or stop openings, that are 0.7, 1.0, 1.4, 2.0, 2.8, 4.0, 5.6, 8, 11, 16, 22, 32, 45, 64, 90, and 128.

FUZZINESS–Lack of image sharpness caused by a defective lens, poor focus, movement, and so forth.

GAIN–The level of amplification for video or audio signals. Increasing the video gain increases the picture contrast.

GENERATION–The number of dubs or copies sway from the original recording. The greater number of generations, the greater loss of picture quality.

GRADUATE–A container for liquids marked off to measure various volumes. (PIA)

GRAIN–The discrete particles of image silver in photographs. The random distribution of these particles in an area of uniform exposure gives rise to the appearance known as “grainiess."

GRAININESS–The subjective impression of non-uniformity in an area of a photograph corresponding to uniform exposure, most often noticeable in enlargements with a magnification of 10 or more.

GRANULARITY–An objective quantitative measure of graininess.

GROUND GLASS–A sheet of glass with a grained or matte (translucent) surface, a focusing screen, diffusing screen, and so forth. (PIA)

GUIDE NUMBER–Values assigned to photographic flood and flash lamps according to American Standard to rate their light output in terms useful in exposure calculation. The guide number for a particular lamp used with a particular film is divided by the distance in feet from the lamp to the subject to find the f/number.

HALATION–A halo or ghost image surrounding the true image of a bright object on a photographic emulsion, caused by reflection of rays of light from the back of the negative material.

HALFTONE–Reproduction of a photograph in which the gradation of tone is reproduced by various sized dots and intermittent white spaces caused by interposing a screen between the lens and the film. (IABPAI)

HALIDE–Any compound of chlorine, iodine, bromine, or fluorine, and silver. Silver bromide, silver chloride, and silver iodide are the light-sensitive materials in silver emulsions.

HANGER, FILM–A frame, usually of metal or plastic, for holding one or more photographic films to facilitate handling during processing.

HARDENER–A chemical that increases the melting point of gelatin in photographic layers and prevents softening in warm-processing baths. Hardeners commonly used in photographic processing baths are aluminum potassium sulfate, chromium potassium sulfate, and formaldehyde solution. (PIA)

HAZE–The presence of foreign matter in the atmosphere to an extent sufficient to reduce even slightly its transparency.

HEAD-ON SHOT–A directionless shot in which the subject comes directly toward the camera. Used to change screen direction.

HEADS–A small assembly within an audio or video recording system that can erase, record, or playback the signal in electromagnetic impulses.

HELICAL SCAN, OR HELICAL VTR (ALSO CALLED SLANT TRACK)–A videotape recording or a videotape recorder in which the video signal is put on tape in a slanted, diagonal way. Because the tape wraps around the head drum in a spiral-like configuration, it is called helical.

HIGH-ANGLE SHOT–A scene photographed on a downward angle; the camera being placed above the action.

HIGH CONTRAST–A term expressing a relationship of image tones in which highlights and shadows are represented by extreme differences of density.

HIGH KEY–A term applied to a photographic print or subject consisting entirely of light tones with little contrast; also applied to a method of lighting a subject.

HIGHLIGHT–The bright parts of a picture or subject that are rendered as dense areas in the negative and by very low density in the print.

HUE–That attribute of certain color perceptions in respect to which they differ characteristically from the gray of the same lightness and which permits them to be classed as reddish, yellowish, greenish, or bluish.

HYDROMETER–Generic term for various instruments designed to determine the specific gravity of liquids. (PIA)

HYDROQUINONE $C_6H_4(OH)_2$–Common photographic developing agent para-dihydoxybenzene.

HYPERFOCAL DISTANCE–The distance from the optical center of lens forward to the nearest plane in acceptable focus when the lens is focused at infinity distance.

ILLUMINANCE–Luminous flux incident per unit area of a surface. Widely known as illumination.

IMAGE, LATENT–The invisible image produced by the action of radiant energy on a photosensitive surface. It may be made visible by the process of photographic development.

IMAGE, NEGATIVE–A photographic image in which the values of light and shade of the original subject are represented in inverse order. In a negative, light objects are represented by high densities and dark objects are represented by low densities.

IMAGE, POSITIVE–A photographic image in which the values of light and shade of the original subject are represented in their natural order. In a positive, light objects are represented by low densities and dark objects are represented by high densities.

IMAGE PLANE–The plane in which the image lies or is formed It is perpendicular to the axis of the lens. A real image formed by a converging lens would be visible upon a screen placed in this plane.

INCANDESCENT–Glowing with heat, such as the tungsten filament in an incandescent lamp.

INCIDENCE–The act of falling upon or affecting, as light upon a surface.

INFINITY–A distance so far removed from an observer that the rays of light reflected to a lens from a point at that distance may be regarded as parallel. A distance setting on a camera-focusing scale.

INFRARED–Pertaining to or designating those rays which lie just beyond the red end of the visible spectrum. They are invisible and are detected by their thermal, photoelectric, and photographic effects. Their wavelengths are longer than those of light and shorter than those of radio waves.

INTERNEGATIVE–An internegative film is a negative derived directly from a color reversal original film. All other color-duplicating negatives derived from any other than reversal film are known as color-duplicating negatives regardless of the generation.

INVERSE SQUARE LAW–The intensity of light received at a point (irradiance) varies inversely as the square of the distance from the source. The law holds for relatively small sources only and is useful in calculating photographic exposures. (PIA)

IRIS DIAPHRAGM–Term applied to the adjustable aperture fitted into the barrel of the photographic lenses and so-called because of the contraction of the aperture resembles that of the iris (pupil) in the human eye. It consists of a series of thin metal tongues overlapping each other and fastened to a ring on the lens barrel, the aperture made smaller or larger by turning the ring. (PIA)

JOGGING–Frame-by-frame advancement of videotape.

KELVIN (°K)–Measurement of the color of light in degrees. Numerically, the Kelvin temperature is equal to the Centigrade temperature plus 273 degrees.

KEY LIGHT–The main source of illumination on a subject. (PIA)

LAMP, PHOTOFLOOD–A lamp designed to yield brilliant diffuse illumination. These lamps are generally short-lived. (NMA)

LAMP, REFLECTOR FLOOD–Light bulb with self-contained silvered surface to act as a reflector.

LAMP HOUSE–That portion of an enlarger, reader, or projector that contains the light source and condensers or mirror.

LAW OF REFLECTION–The angle of reflection is equal to the angle of incidence.

LENS–In photography, the optical instrument or arrangement of light-refracting elements in a group; the whole designed to collect and distribute rays of light in the formation of an image.

LENS, COMPOUND–A lens composed of two or more separate elements with a common axis. (PIA)

LENS, MIRROR–One employing reflecting elements in addition to light-transmitting elements; usually to obtain compactness in telephoto objectives. (PIA)

LENS ELEMENTS–Individual simple lenses that are combined to form a compound lens. (PIA)

LIGHT, AMBIENT–Surrounding light; the general room illumination or light level.

LIGHT, DIFFUSED–Light that does not reach the subject in a single beam but is scattered by a medium, such as clouds, ground glass, spun glass, or thin fabric.

LIGHT, FILL-IN–Secondary illumination directed to illuminate shadow areas and avoid excess contrast. Also known as fill light. (PIA)

LIGHT, INCIDENT–The light that strikes an object, distinguished from the light reflected from or transmitted by the object. (PIA)

LIGHT, POLARIZED–Light in which the electric vector of the wave vibrates in one plane, rather than all planes, as it does in ordinary (unpolarized) light. Light may become polarized by reflection or by passing through optical devices or sheets known as "polarizers."

LIGHT BOX–A device for viewing transparencies or negatives, providing diffuse illumination evenly dispersed over the viewing area.

LIGHT SENSITIVE–Materials that undergo changes when exposed to light. The commonly used photographic light-sensitive materials are the silver halides used in films and papers, diazo dyes, and bichromated gelatin. (PIA)

LIGHTING, FLAT–Illumination of a photographic subject often achieved by frontlighting or multiple sources with diffusers that minimizes contrasts and shadows. (PIA)

LIGHTING, FRONT–Illumination on the subject coming from near the camera position. (PIA)

LIGHTING, INDIRECT–Illumination by means of light reflected to the scene from shielded sources.

LIGHTING, LOW KEY–A type of lighting which when applied to a scene results in a picture having gradations from middle gray to black, with comparatively limited areas of light gray and whites.

LINE COPY–A document consisting essentially of two tones (such as black and white, black and tinted, and brown and buff) without intermediate tones.

LITER–A unit of capacity in the metric system, equivalent to 1.056 quarts in United States customary liquid measurement. (PIA)

LOADING–The insertion of photographic film, plates, or paper into holders, hangers, magazines, and so forth, before exposure or processing.

LONG SHOT–In motion pictures, a scene filmed at a considerable distance from the camera to establish locale. Also applied to scenes which show full-length figures, as opposed to waist-length, head and shoulders, and so forth.

LOW-ANGLE (SHOT)–Where camera is placed low and the scene is photographed at an upward angle.

LUX–Lumen per square meter, a unit of illuminance.

MASK–(l) An opaque sheet of thin material used to limit the area of a picture or to secure white margins on a photograph. (2) A supplementary negative or positive used for the purpose of contrast correction in black-and-white prints. (3) A supplementary positive either on a separate sheet or incorporated in an integral color tripack negative for the purpose of color correction. (PIA)

MATTE–A relatively dull surface on photographic prints, having a very low level of specular reflection.

MATTE BOX–A device attached to the front of a camera to hold mattes, filters, diffusing screens, and so forth, in front of the lens.

MEDIUM–Any substances or space through which light can travel.

METER–A unit of length measurement in the metric system approximately equal to 39.37 inches.

METOL-HYDROQUINONE (M-Q)–Designating photographic developers that use a combination of metol and hydroquinone as the developing agent.

METRIC SYSTEM–A decimal system of measurement based on the meter as the unit of length, the kilogram as the unit of mass, and the liter as the unit of capacity.

MICRON–A unit of length in the metric system equal to 0.001 millimeter.

MILLILITER–A unit of volume in the metric system.

1 mL = 0.03381 fl oz

29.57 mL= 1 fl oz

3785 mL= 1 gal

MILLIMETER–A unit of length measuring 0.001 of a meter; 25.4 millimeters equal approximately 1 inch.

MILLIMICRON–A unit of length in the metric system equal to 0.001 micron. It is also equivalent to 10 angstroms.

MODELING–Photographic term for the feeling of "plasticity" engendered by a photograph or the three-dimensional effect produced in a photograph by effective camera work and lighting. (PIA)

MOTTLE–A photographic defect characterized by nonuniform density differences; usually in the pattern of tiny, circular areas.

MOUNT, BAYONET–A means of quickly attaching or removing a lens or filter by turning through only part of a revolution.

MOUNTING–The process of fastening a photographic print to a support.

NEAR POINT–The nearest object to the camera that is still acceptably sharp when the camera is focused for a given distance.

NEGATIVE, BLACK-AND-WHITE–A photographic image on film or paper in which light tones are rendered dark and dark tones appear light.

NEGATIVE, COLOR–A negative record of the color values of the original object. Not only are light values represented by negative densities but colors are represented negatively by their color complements. (PIA)

NEUTRAL–Hueless or achromatic color; gray. Chemically, a solution that is neither acid nor alkaline. (PIA)

NOISE–Unwanted sounds or electrical interference in an audio or video signal. In the audio track, there is a hiss or humming sound. In the video picture the interference appears as "snow."

NORMAL–Sometimes called the perpendicular. An imaginary line forming right angles with a surface or other lines. It is used as a basis for determining angles of incidence, reflection, and refraction.

NOTCHING CODE–One or more notches of characteristic shape placed by the manufacturer in one edge of a sheet of photographic film to identify the emulsion side and the emulsion type. (PIA)

NTSC–National Television Standards Committee. U.S. standards for television or video signal broadcasting. Also known as the composite signal (Y/C).

OPACITY–(l) The ability of an object to absorb light. (2) Photographic term for the light-stopping power of the silver deposit in negative images. Opacity = 100/Transmittance in percent.

OPAQUING–All handwork on a negative to remove spots or unwanted images.

OPEN FLASH–A method of taking photoflash pictures in which the camera shutter is held open during the flash and then closed.

OPTICAL CENTER–The point, generally within a lens but sometimes exterior to it, at which the optical axis and all chief rays of oblique ray bundles intersect.

ORIGINAL–Material from which copies are made, such as handwritten copy, typed copy, printed matter, tracings, drawings, and photographs. (IABPAI)

OVERCOATING–A thin layer of clear or dyed gelatin sometimes applied on top of the emulsion surface of a film to act as a filter layer or to protect the emulsion from abrasion during exposure and processing.

OVERDEVELOP–To permit a photographic image to be developed too much because of one or more of the following factors: (1) excessive time, (2) excessive temperature, (3) overstrength of developer solution, and (4) excessive agitation.

OVEREXPOSE–To permit too much exposure of a photographic emulsion. This may be caused by (1) too brilliant light, (2) too large an aperture, or (3) too much time.

OVEREXPOSURE–A photographic exposure that exceeds the maximum latitude of the sensitized materials.

OXIDATION–Chemical combination of oxygen with other substances. In photography, the loss of activity of developer solutions is due partly to oxidation of the developing agent with oxygen in the air and partly to oxidation with the silver halide during development. (PIA)

PAN (WITH A CAMERA)–During the course of photographing a scene, to swing the camera around in such a way as to follow the action. Derived from: Panorama. Camera pans are commonly described as slow-pan, fast-pan, swish-pan, and jerky-pan.

PAPER, VARIABLE CONTRAST–Photographic paper coated with emulsions having contrast characteristics grading from soft to hard, depending on the color of the exposing light as modified by a series of filters supplied for that purpose.

PARALLAX–The apparent displacement of an object seen from different points. Commonly encountered in photography in the difference between the image seen in the viewfinder and that actually taken by the lens.

PERSISTENCE OF VISION–A property of the eye that consists of an inability to detect the flickering of a light that exceeds a certain critical frequency.

PERSPECTIVE–The relative size and alignment of objects as recorded on a plane surface; the illusion of three dimensions created on a flat surface.

PHOTOELECTRIC CELL–A cell that converts light energy proportionally into electrical energy. It is used in exposure meters and sound recorders and reproducers.

PHOTOMETER–An instrument for measuring the visual intensity of light, specifically for comparing the relative intensities of light emitted from different sources of illumination. (PIA)

PICKUP TUBE–The imaging device of a video camera that converts light into electrical energy-the video signal.

PINHOLE–(l) Term applied to tiny spots in a photographic negative; usually produced as the shadow of a dust particle during exposure, more rarely the result of chemical dust contamination or gas bubble formation in the gelatin layer due to improper processing. (2) Tiny or white or clear areas in a print or drawing material.

PINT, LIQUID–A unit of capacity equal to 16 fluid ounces, or 473.17 milliliters.

PIXEL–The smallest single picture element with which an image is constructed. The light-sensitive elements in a CCD (chip) camera.

PLANE–A surface which has no curvature; a perfectly flat surface.

POLARIZER–An optical device for converting unpolarized, or natural light, into polarized light.

POSITIVE, BLACK AND WHITE–A photographic image on film, plate, or paper in which light tones appear light and dark tones are rendered dark

POSITIVE FILM–Photographic film, designed for the printing of positive transparencies from negatives.

POSITIVE PRINT–A print in which the light and dark areas as they exist in the original.

POTASSIUM BROMIDE (BROMIDE OR POTASH), KBr–White crystals, very soluble in water. Used as a restrainer in developing solutions. Also used in bleaches and clearing solutions.

POTASSIUM HYDROXIDE KOH–Caustic alkali used as an accelerator in photographic developers. Concentrated solutions are quite caustic and will attack the skin, causing painful burns. Similar to sodium hydroxide.

POWER, RESOLVING–The measure of the ability of a lens, a photographic material, or a combination of both, to distinguish detail under certain specific conditions, among which are the shape and contrast of the target, the quantity of illumination, the exposure and the method of processing. The measure of this ability is expressed in lines per millimeter or in angular resolution of a lens.

PREROLL–To start a videotape and let it roll for a few seconds before it is put in the playback or record mode, so the electronic system has time to stabilize.

PRESERVATIVE–The ingredient of a photographic developer that protects it from rapid oxidation.

PRINTER, CONTACT–A photographic printer in which the negative is held in contact with print material during the exposure. The image of a print made with a contact printer is the same size as the image in the negative.

PRINTER, PROJECTION–A photographic printer in which the negative is positioned some distance from the print material; the image being projected onto the print material. The image of a print made with a projection printer is usually larger than the image in the negative.

RADIANT ENERGY–Energy in the form of an electromagnetic wave; for example, gamma rays, X rays, ultraviolet energy, light, infrared energy, radiant heat, and radio waves.

RADIATION–The process of emitting electromagnetic energy.

RECIPROCITY LAW–Exposure is equal to the intensity of the exposing light multiplied by the time during which it acts. The same density should be produced in a photosensitive material by an equal exposure obtained by doubling the intensity of the light and cutting the time of the exposure in half. This law is only approximately followed by photographic materials, and deviations from it are known as "reciprocity law failures."

RECTILINEAR–In a straight line. When applied to a lens, it indicates that images of straight lines produced by the lens are not distorted.

REDUCING AGENT–A chemical constituent of a photographic developer that changes the exposed silver halide to metallic silver. Reducing agents must be combined with other chemicals to confine their activity to the silver grains that have been exposed, to control the rate of reaction, and to preserve the agent from combining with oxygen in the air before it can do the work of development. Reducing agents are also called photographic developers.

REFLECTED LIGHT–Light that has been deflected from an opaque surface; not having been absorbed.

RELATIVE APERTURE–The relative aperture is the ratio of equivalent focal length to the diameter of the effective aperture. The symbol for relative aperture written as a fraction is f/ followed by a numerical value. To illustrate, the expression f/2 signifies that the diameter of the effective aperture is one half of the focal length.

RELATIVE HUMIDITY–Ration of aqueous vapor present in a space at a given temperature, as compared with the greatest amount it could possibly contain at that temperature.

REPLENISHER–An additional agent used to maintain the chemical strength of a processing solution at a constant level. (NMA)

RESOLUTION–In optics, the ability of a lens system to reproduce an image in its finest details. See RESOLVING POWER.

RESOLVING POWER–The degree to which a lens, optical system, or film emulsion is able to define the details of an image, expressed as the maximum number of black lines, with equal white interspaces per millimeter discernible in the image. Results obtainable for a given lens or emulsion vary with contrast of the original image and with development.

RESTRAINER–The ingredient of a photographic developer that prevents too rapid development and that minimizes chemical fog.

RETICULATION–A processing defect affecting gelatin layers on a photographic film which, upon drying, shows an irregular surface due to the formation of small, irregular scaly patterns. Sharp differences in the temperatures of successive processing solutions and insufficient hardening of the gelatin are the usual causes of reticulation.

RGB–The separate red, green, and blue color (chrominance), or "C", video signals.

SCALE, FOCUSING–A calibrated scale that permits focusing a camera without the use of a range finder or ground glass.

SCRIM–Diffusing medium placed in front of lamps.

SEMIMATTE–A surface having a moderate, interrupted sheen midway between glossy and dull, or full matte.

SENSITIVITY–The degree to which an emulsion reacts by the formation of a latent image under given exposure conditions, especially as this relates to exposure by different wavelengths (colors) of light. (NMA)

SENSITIZING DYE–Any dyestuff used for sensitizing a photographic emulsion.

SENSITOMETER–An instrument with which a photographic emulsion is given a graduated series of exposures to light of controlled spectral quality, intensity, and duration.

SHADOW–General term for the thinner areas of a negative or the darker areas of an original.

SHOT–(1) Motion picture. The most basic unit of a film; a single scene; the continuous action occurring from the time the camera is turned on to the time it is turned off. (2) Still picture. A single exposure or photograph.

SHUTTER, BETWEEN-THE-LENS–A shutter whose blades operate between two elements of the

lens, as differentiated from the focal plane or behind-the-lens shutters. Sometimes applied to an iris diaphragm whose blades operate between lens elements.

SHUTTER, FOCAL-PLANE–A shutter located near the focal plane and consisting of a curtain with a slot that is pulled across the focal plane to make the exposure. The width of the slit and the speed it is moved determine the duration of the exposure.

SHUTTER RELEASE–A device to actuate a camera shutter.

SHUTTER SPEED–The length of time that light is permitted to act upon film or paper as a result of the shutter having opened and closed.

SILHOUETTE–An art term for the outline of a form in black or white that is offset by a background of the contrasting color. (PIA)

SILVER HALIDE–A compound of silver and one of the following elements known as halogens: chlorine, bromide, iodine, and fluorine. (NMA)

SLANT TRACK–Same as helical scan.

SODIUM HYDROXIDE (CAUSTIC SODA, SODIUM HYDRATE), NaOH–A deliquescent white material usually available as pellets, flakes, or sticks. Soluble in water with the liberation of heat. A very active accelerator used in high-energy developers. Concentrated solutions are quite caustic and will attack the skin, causing painful burns.

SODIUM THIOSULFATE (THIOSULFATE OF SODA, HYPO) $Na_2S_2O_35H_2O$–Colorless crystals, very soluble in water. It is the principal constituent of most fixing solutions. It may be available in the anhydrous form.

SOFT–(l) As applied to a photographic emulsion or developer, having a low contrast. (2) As applied to the lighting of a set, diffuse, giving a flat scene in which the brightness difference between highlights and shadows is small.

SOFT FOCUS–An unsharp photographic image or a special lens or exposing technique by means of which it is produced. (PIA)

SPECIFIC GRAVITY (LIQUID AND SOLID)–The ratio of the weight of a substance to the weight of an equal volume of distilled water.

SPECULAR–Like a mirror, reflecting in a regular manner so that clear images may be formed, nondiffusing.

SPOT–A contraction of “spotlight”; a lamp which projects a narrow, strong beam of light. (Verb) To remove spots from photographic prints, sometimes called "positive retouching" or"print retouching."

SQUEEGEE–(l) A rubber blade mounted in a holder which, when drawn over the surface of a wet film or paper, removes the surface liquid. (2) Rollers used for the same purpose. (3) On continuous processing machines, air squeegees may be used that remove surface liquid by either suction or by blowing air against material being processed.

STAIN–A local or general discoloration of negatives and prints.

STEP TEST–(l) A series of exposures made with gradual increases in illumination used to determine proper exposure conditions. (2) To test for contrast or latitude, you can use a step wedge in a single exposure. (NMA)

STOP BATH–A stop bath is an acid solution used to arrest development by neutralizing the alkaline developer with which the photographic material is saturated as it leaves the developing bath.

STROBE–Designates an electronic flash lamp.

SUBTRACTIVE PRIMARIES–The three printing colors used in three-color subtractive color processes: magenta (minus green), cyan (minus red), and yellow (minus blue-violet). (PIA)

SYNCHROFLASH –Photographic arrangement whereby a photoflash lamp is timed to provide illumination at the instant when the camera shutter is wide open.

TIME BASE CORRECTOR (TBC)–An electronic accessory to a videotape recorder that helps make playbacks or transfers electronically stable. A TBC helps to maintain picture stability even in dubbing-up operations.

TIME TEMPERATURE CHART–A table showing the optimum time of development at the standard temperature for various photographic materials in a given developer or for different times of development in order to obtain equivalent development at nonstandard temperatures. (PIA)

TONE–(l) In a photographic negative or print, the degree of lightness or darkness of the various parts of the image. (2) A term applied to the color of the image in a photographic print; that is, warm, cold, sepia, and so forth.

TRANSILLUMINATE –To illuminate through a document, from the side opposite the camera.

UNDERDEVELOPMENT –Insufficient development; due to developing for too short a time, use of a weakened developer or, occasionally, too low a temperature.

UNDEREXPOSURE–Insufficient exposure of a photographic material, causing thin or weak images and a corresponding loss of detail. (PIA)

VANISHING POINT–In a perspective view, the point where parallel lines receding from the observer seem to come together.

VELOCITY OF LIGHT–Term applied to the speed of light waves in a vacuum (Co); 229,792.5 kilometers per second, or approximately 186,000 miles per second. In all other media, light travels at a slower rate.

VIDEO CASSETTE–A plastic container in which a videotape moves from a supply reel to a take-up reel. Used in all but the 1-inch VTRs.

VISIBLE SPECTRUM–The portion of the electromagnetic spectrum to which the retina is sensitive and by which we see. Extends from about 400 to 750 millimicrons in wavelengths of radiation.

VTR–Videotape recorder or recording. Includes video cassette recorders.

WASHING–Act of removing soluble chemicals from photographic layers through the agency of water, especially the removal of fixation products and hypo in order to avoid subsequent fading or discoloration of the silver image.

WATER SPOTS–Deformation of photographic gelatin layers on a film or plate due to differential drying when water drops stand on the surface and keep the gelatin wet and swollen after the surrounding gelatin has become dried and compressed. The spots have a characteristic appearance when a negative on which they occur is printed. Viscose sponges and wetting solutions (detergents) are commonly used to avoid such defects. (PIA)

WAVELENGTH–Length of a wave measured from any point on one wave to the corresponding point on the next wave; usually measured from crest to crest. Wavelength determines whether radiant energy is classed as gamma rays, X rays, or ultraviolet, visible, infrared radiant energy, or radio. Wavelength of visible radiant energy is the chief determinant of its perceived color.

WETTING AGENT–A chemical added to water to reduce surface tension, thereby improving wetting characteristics and reducing the formation of water drops. (NMA)

Y/C–The separate processing of the luminance (Y) and chrominance (C) signals.

APPENDIX II

FORMULAS

Relative Aperture: $f = \frac{F}{D}$

Hyperfocal Distance: $H = \frac{F^2}{f \times C}$

Near Distance: $ND = \frac{H \times D}{H + D}$

Far Distance: $FD = \frac{H \times D}{H - D}$

Ratio between image size and object (subject) size: $R = \frac{Image\ size}{Object\ size}$

Object Focal Distance: $F + (F \div R)$

Image Focal Distance: $F + (F \times R)$

IFGA: $\frac{I}{F} = \frac{G}{A}$

Filter Factor Exposure Compensation: $\frac{ISO}{Filter\ Factor}$

or

$Shutter\ Speed \times Filter\ Factor$

Exposure: $E = I \times T$ or $H = E \times T$

Bellows Extension:

New Exposure Time $(\frac{BE}{FL})^2 \times T$

or

Adjuted f/stop: $\frac{indicated\ f/stop \times focal\ length}{lens\text{–}to\text{–}film\ distance}$

Fahrenheit to Celsius: $°F - 32 \times 5/9$

Celsius to Fahrenheit:	$°C \times 9/5 + 32$
Changing Solution Strength:	$\frac{\textit{Amount Wanted}}{\textit{Strength on Hand}} \times \textit{Strength Desired}$
Exposure Time (in seconds) for Motion-Picture Camera:	$\frac{\textit{Shutter-Degree Opening}}{360 \times \textit{fps}}$

APPENDIX III

REFERENCES USED TO DEVELOP THE TRAMAN

Reference	Chapters
Basic Developing & Printing, Kodak Publication No. AJ-2, Eastman Kodak Company, Rochester, N.Y., 1987.	10,11
Basic Developing, Printing, Enlarging in Color, Kodak Publication No. AE- 13, Eastman Kodak Company, Rochester, N.Y., 1984.	10,12
Conservation of Photographs, Kodak Publication No. F-40, Eastman Kodak Company, Rochester, N.Y., 1985.	14
DeCock, Liliane, ed., *Photo Lab Index Lifetime Edition,* 41st ed., Morgan & Morgan, Inc., Dobbs Ferry, N.Y., 1990.	1-3,5,6,9-12
Department of the Navy Information and Personnel Security Program Regulation, OPNAVINST 5510. 1H, Office of the Chief of Naval Operations, Washington, D.C., 1991.	6,14
Duckworth, John E., *Forensic Photography,* Charles C. Thomas, Publisher, Springfield, Ill., 1983.	6
Environmental and Natural Resources Program Manual, OPNAVINST 5090.1 A, Office of the Chief of Naval Operations, Washington, D.C., 1990.	9
Hart, John, *50 Portrait Lighting Techniques for Pictures that Sell,* American Photographic Book Publishing, New York, N.Y., 1983.	7
Intelligence Photography, Basic, Training Guide No. J-243-0974, Fleet Intelligence Training Center Pacific, San Diego, Calif., 1990.	6
Jacobson, Ralph E., Sidney F. Ray, and Geoffrey G. Attridge, *The Manual of Photography,* 8th ed., Butterworth & Co. (Publishers) Ltd, London, England, 1988.	1-4,9-13

Reference	Chapters
Kodak Color Films and Papers for Professionals, Kodak Publication No. E-77, Eastman Kodak Company, Rochester, N.Y., 1986.	10,12
Printing Color Negatives, Kodak Publication NO. E-66, Eastman Kodak Company, Rochester, N.Y., 1982.	12
Professional Photographic Illustration Techniques, 1st ed., Kodak Publication No. O-16, Eastman Kodak Company, Rochester, N.Y., 1978.	5
Professional Portrait Techniques, Kodak Publication No. O-4, Eastman Kodak Company, Rochester, N.Y., 1987.	7
Naval Visual Information Management and Operations Manual, OPNAVINST 5290.1 A, Office of the Chief of Naval Operations, Washington, D.C., 1990.	7, 14
Navy and Marine Corps Records Disposition Manual, SECNAVINST 5212.5C, Office of the Secretary, Washington, D.C., 1988.	14
Navy Occupational Safety and Health (NAVOSH) Program Manual, OPNAVINST 5100.23B, Office of the Chief of Naval Operations, Washington, D.C., 1989.	9
Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, OPNAVINST 5100.19B, Vols. 1 & 2, Office of Chief of Naval Operations, Washington, D.C., 1990.	9
Opticalman 3 & 2, NAVEDTRA 10205-C, Naval Education and Training Program Management Support Activity, Pensacola, Fla., 1979.	1
Permission to Copy Materials Subject to Copyright, SECNAVINST 5870.5, Office of the Secretary, Washington, D.C., 1988.	8
Quality Enlarging with Kodak Black-and- White Papers, 1st ed., Kodak Publication G-1, Eastman Kodak Company, Rochester, N.Y., 1985.	11
Safety Precautions for Photographic Personnel, NAVAIR 10-1-764, Naval Air Systems Command, Washington, D.C., 1960.	9

Reference	Chapters
Ships' Maintenance Material Management (3-M) Manual, OPNAVINST 4790.4B, Office of the Chief of Naval Operations, Washington, D.C., 1990.	4, 10
Upton, Barbara, and John Upton, *Photography*, 2d ed., Little, Brown and Company, Toronto, Canada, 1981.	1-5, 10-12
Wurtzel, Alan, and Stephen R. Acker, *Television Production*, 3d ed., McGraw-Hill, New York, N.Y., 1989.	13
Zettl, Herbert, *Television Production Handbook*, 5th ed., Wadsworth Publishing Company, Belmont, Calif., 1992.	13

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